University: P. J	. Šafárik Univers	ity in Košice			
Faculty: Facult	y of Arts				
Course ID: ÚF ASFU/15	Course ID: ÚFV/ Course name: Astrophysics ASFU/15				
Course type, sc Course type: 1 Recommended Per week: 3 Pe Course metho	Course type, scope and the method: Course type: Lecture Recommended course-load (hours): Per week: 3 Per study period: 42 Course method: present				
Number of cree	lits: 3				
Recommended	semester/trimes	ster of the cours	e: 3.		
Course level: II	•				
Prerequisities:					
Conditions for Test within the Oral exam with	course completi curriculum prese preparation; 3 q	on: nted during the c uestions within t	ourse; seminar he curriculum p	essay. resented during th	ne course.
Learning outco Become acquai	mes: nted with basic k	nowledge about	the structure and	d evolution of the	universe.
Brief outline of the course: The stars, their basic properties, structure and evolution. Structure and distribution of matter in the universe. Cosmological theories, formation, evolution and future of the universe.					
 Recommended literature: 1. Carroll, B. W., Ostlie, D. A., An Introduction to Modern Astrophysics, Addison-Wesley Publishing Company, Reading, Massachusetts, 1996; 2. Contopoulos, D. Kotsakis, Cosmology, the structure and evolution of the Universe, Springer, 1984; 3. Narlikar, J.V., An Introduction to Cosmology, Cambridge University Press, Cambridge, 2002; 4. Pasachoff, J.M., Filippenko, A., The Cosmos: Astronomy in the New Millennium, Cambridge University Press, 2013; 					
Course languag Slovak, English	ge:				
Course assessm Total number o	ent f assessed studen	ts: 4			
А	В	С	D	E	FX
100.0	0.0	0.0	0.0	0.0	0.0
Provides: doc.]	RNDr. Rudolf Gá	ilis, PhD.			
Date of last mo	dification: 21.02	2.2017			
Approved: Gua	ranteedoc. PhDr.	Anna Džambov	á, PhD.Guarant	eeprof. PhDr. Ol'g	ga Orosová, CSc.

University: P. J. Šafá	University: P. J. Šafárik University in Košice				
Faculty: Faculty of Arts					
Course ID: ÚFV/ DEJ1/99	Course name: History of Physics				
Course type, scope and the method: Course type: Lecture Recommended course-load (hours): Per week: 2 Per study period: 28 Course method: present					
Number of credits: 2					
Recommended seme	ster/trimester of the course: 2.				
Course level: I., II.					
Prerequisities:					
Conditions for cours written test and thesis exam	Conditions for course completion: written test and thesis exam				
Learning outcomes: Basic facts in the history of physics.					
Brief outline of the c Evolution of knowled world. Evolution and evolution of the theor and their application, natural sciences and p	ourse: lge before Galileo. Evolution of physics within the mechanical picture of the l limits of classical physics, phase of breakthrough in physics. Origin and y of relativity. Quantum physics and prospects of further evolution of physics . Contemporary state of physical research and its application in technology, philosophy. Position of physics in our society.				
Recommended litera 1. R.Zajac, J.Chrapar 2. V.Malíšek: Co víte 3. I.Kraus, Fyzika v k Praha, 2006. 4. A.I.Abramov: Istor 5. L.I.Ponomarev: Po 6. I.Kraus, Fyzika v k ČVUT, Praha, 2007. 7. I.Kraus, Fyzika od 8. I.Štoll, Dějiny fyzi 9. www-pages. 10.Brandt S., The han 2009.	 ture: t: Dejiny fyziky, skriptá, MFF UK, Bratislava, 1982. o dějinách fyziky, Horizont, Praha, 1986. culturních dějinách Evropy, Starověk a středověk, Nakladatelství ČVUT, tria jadernoj fiziky, KomKniga, Moskva, 2006. td znakom kvanta, Fizmatlit, Moskva, 2006. culturních dějinách Evropy, Od Leonarda ke Goethovi, Nakladatelství Thaléta k Newtonovi, Academia, Praha, 2007. ky, Prometheus, Praha, 2009. 				
Course language:					
Course assessment Total number of asses	ssed students: 22				

А	В	С	D	Е	FX
81.82	9.09	9.09	0.0	0.0	0.0
Provides: prof. RNDr. Stanislav Vokál, DrSc.					
Date of last modification: 20.02.2017					
Approved: Guaranteedoc. PhDr. Anna Džambová, PhD.Guaranteeprof. PhDr. Oľga Orosová, CSc.					

University: P. J. Šaf	fárik Universit	y in Košice			
Faculty: Faculty of	Arts				
Course ID: ÚFV/ DEX/15	V/ Course name: Selected Demonstration Experiments				
Course type, scope Course type: Lect Recommended co Per week: 2 / 1 Pe Course method: p	and the meth ure / Practice urse-load (ho r study period present	od: urs): d: 28 / 14			
Number of credits:	3				
Recommended sem	ester/trimest	er of the cours	se: 2.		
Course level: II.					
Prerequisities:					
Conditions for courseminar work – a p Oral examination	rse completion roject dealing	n: with hands-on	experiments and	l their role in Phy	sics teachig.
Learning outcomes The goal of the cou through non-traditio	rse is to develo onal physical e	op pedagogic sl experiments.	kills and creativi	ty of further Phys	sics teachers
help students under experiments are mai any special equipm experiments student theoretical knowled	stand physical inly hands-on nent. The expe ts are able to g lge.	l phenomena a ones which can eriments are ca gain practical sl	nd find their cor be performed w rried out by stuc cills, develop exp	nnection with ever vith simple tools a dents themselves perimental habits	eryday life. The and don't require Through these and verify their
Recommended liter 1. Onderová Ľ.:Net 2. Lorbeer,G.L.,Nel 3. Kostič, Ž.: Medz 4. Kireš, M., Onder Bratislava 2001, ISI 5. http://physedu.sc	rature: radičné experi lsonová, L.W.: i hrou a fyziko ová, Ľ.: Fyzika BN 80-7097-4 ience.upjs.sk/s	menty vo vyuč Fyzikální poku ou, Alfa, Bratisl a každodennéh 46-X sis/fyzika/exper	ovaní fyziky, MC usy pro děti, Port lava, 1971 o života v experi rimenty/index.hti	C Prešov,2002 tál, Praha, 1998 imentoch a úlohá m	ch, JSMF
C ourse language: Slovak					
Course assessment Total number of ass	sessed students	s: 2			
A	В	С	D	Е	FX
100.0	0.0	0.0	0.0		
100.0	0.0	0.0	0.0	0.0	0.0
Provides: PaedDr. I	0.0 veta Štefančín	ová, Ph.D.	0.0	0.0	0.0

Approved: Guaranteedoc. PhDr. Anna Džambová, PhD.Guaranteeprof. PhDr. Oľga Orosová, CSc.

University: P. J.	. Šafárik Univers	sity in Košice			
Faculty: Faculty	Faculty: Faculty of Arts				
Course ID: ÚF DF1a/15	rse ID: ÚFV/ Course name: Didactics of Physics I a/15				
Course type, scope and the method: Course type: Lecture / Practice Recommended course-load (hours): Per week: 2 / 2 Per study period: 28 / 28 Course method: present					
Number of crea	lits: 4				
Recommended	semester/trime	ster of the cours	e: 2.		
Course level: II	•				
Prerequisities:					
Conditions for course completion: teaching plan for two lessons 10p micro teaching activities 20p educational project 20p answering questions during the course 10p end-of course oral examination 40p					
Learning outcomes: Knowledge and skills in the field of Physics education, overview about the problems of Physics education, basic skills necessary to prepare and quide educational activities, school experiments, problem solving and to use modern media for physics education.					
Brief outline of the course: Within the Didactics of Physics subject the core problems of physics education are introduced and case studies of their solving are interpreted. Strategies on design and implementation of educational activities, their evaluation and the use of modern media are introduced and corresponding skills are trained.					
 Recommended literature: 1.J. Janovič a kol.: Didaktika fyziky, MFF UK Bratislava, 1990 2.J. Janovič a kol.: Vybrané kapitoly didaktiky fyziky, MFF UK Bratislava, 1999 3.E. Kašpar a kol.: Didaktika fyziky, SPN Praha, 1978 4.E. Mechlová: Didaktika fyziky 1, 2, PdF Ostrava, 1989 5.J. Fenclová: Úvod do teórie a metodológie didaktiky fyziky, SPN Praha, 1982 Primary school textbooks for Physics actuall didactic publications 					
Course language: Slovak, English					
Course assessm Total number of	ent f assessed studer	nts: 9			
А	В	С	D	Е	FX
55.56	44.44	0.0	0.0	0.0	0.0

Provides: doc. RNDr. Marián Kireš, PhD., PaedDr. Iveta Štefančínová, Ph.D.

Date of last modification: 23.02.2017

Approved: Guaranteedoc. PhDr. Anna Džambová, PhD.Guaranteeprof. PhDr. Oľga Orosová, CSc.

University: P. J. Šafá	rik University in Košice				
Faculty: Faculty of A	Arts				
Course ID: ÚFV/ DF1b/15	Course name: Didactics of Physics II				
Course type, scope and the method: Course type: Lecture / Practice Recommended course-load (hours): Per week: 2 / 2 Per study period: 28 / 28 Course method: present					
Number of credits: 4	4				
Recommended seme	ester/trimester of the course: 3.				
Course level: II.					
Prerequisities: ÚFV	/DF1a/15				
teaching plan for two lessons 10p micro teaching activities 20p educational project 20p answering questions during the course 10p end-of course oral examination 40p					
Learning outcomes: knowledge and skills education, basic skill problem solving and	s in the field of Physics education, overview about the problems of Physics is necessary to prepare and quide educational activities, school experiments, to use modern media for physics education				
 Brief outline of the course: 1. Didactic methods, forms and tools in physics education 2. Graphs in education 3. Control, evaluation and assessment of students results, 4. Tests 5. Everyday physics and its application in education 6. Computer based measurements: 7. Using of Internet and multimedia in education 8. IBSE 9. Informal activities to support physics education 10. Life long learning, science teacher training 11. 12. Semestral project presentation 					
Recommended litera 1.J. Janovič a kol.: D 2.J. Janovič a kol.: V 3.E. Kašpar a kol.: D 4.E. Mechlová: Dida 5.J. Fenclová: Úvod 6.Vachek, J. a kol.: F 7.Svoboda, E. a kol. 8.Lepil, O. a kol.: Fy	ature: vidaktika fyziky, MFF UK Bratislava, 1990 ýbrané kapitoly didaktiky fyziky, MFF UK Bratislava, 1999 vidaktika fyziky, SPN Praha, 1978 ktika fyziky 1, 2, PdF Ostrava, 1989 do teórie a metodológie didaktiky fyziky, SPN Praha, 1982 ýzika pre 1. ročník gymnázia. SPN, Bratislava, 1984. Fyzika pre 2. ročník gymnázia. SPN, Bratislava, 1985. vzika pre 3. ročník gymnázia. SPN, Bratislava, 1986.				

9. Pišút, J. a kol.: Fyzika pre 4. ročník gymnázia. SPN, Bratislava, 1987.

10. Scholtz, E., Kireš, M.: Fyzika - Kinematika pre osemročné gymnáziá, SPN, Bratislava, 2001, 104 strán, ISBN 80-08-02848-3

11.Blaško, M., Gajdušek, J., Kireš, M., Onderová, Ľ.: Molekulová fyzika a termodynamika pre osemročné gymnáziá, SPN, Bratislava, 2004, 120 strán, ISBN 80-10-00008-6

12.Scholtz, E., Kireš, M.: Fyzika - Dynamika pre osemročné gymnáziá, SPN, Bratislava, 2007, 231 strán, ISBN 80-10-00013-2

School textbooks for Physics education at upper secondary level

Course language:

Slovak, English

Course assessment

Total number of assessed students: 5

А	В	С	D	Е	FX
100.0	0.0	0.0	0.0	0.0	0.0

Provides: doc. RNDr. Marián Kireš, PhD., PaedDr. Iveta Štefančínová, Ph.D.

Date of last modification: 23.02.2017

Approved: Guaranteedoc. PhDr. Anna Džambová, PhD.Guaranteeprof. PhDr. Ol'ga Orosová, CSc.

Faculty: Faculty of Arts Course ID: ÚFV/ DPOU/14 Course name: Diploma Thesis and its Defence Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: present Number of credits: 15 Recommended semester/trimester of the course:			
Course ID: ÚFV/ DPOU/14 Course name: Diploma Thesis and its Defence Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: present Number of credits: 15 Recommended semester/trimester of the course:			
Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: present Number of credits: 15 Recommended semester/trimester of the course:			
Number of credits: 15 Recommended semester/trimester of the course: Course levels H			
Recommended semester/trimester of the course:			
Course lough II			
Prerequisities:			
Conditions for course completion: Preparation and submission of diploma thesis in printed and electronic form. Presentation of diploma thesis results and its defence in front of examination board.			
Learning outcomes: Knowledge and skills connected with selected problem analysis and presentation of diploma thesis results in front of experts.			
Brief outline of the course: Preparation and submission of diploma thesis to central registration system. Printed version for reviewing. Presentation of diploma thesis results and answers to the questions of reviewrs. Discussion on the content of diploma thesis and answers to the questions of examination board members.			
Recommended literature:			
Course language:			
Course assessment Total number of assessed students: 15			
A B C D E FX			
73.33 13.33 13.33 0.0 0.0 0.0			
Provides:			
Date of last modification: 23.02.2017			
Approved: Guaranteedoc. PhDr. Anna Džambová, PhD.Guaranteeprof. PhDr. Oľga Orosová, CSc.			

University: P. J. Šafá	University: P. J. Šafárik University in Košice			
Faculty: Faculty of A	rts			
Course ID: ÚFV/ DPP1/14	Purse ID: ÚFV/ Course name: Diploma Project I P1/14			
Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: present				
Number of credits: 1				
Recommended seme	ster/trimester of the course	e : 1		
Course level: II.				
Prerequisities:				
Conditions for course completion: regular consultations with diploma thesis supervisor about the progress of diploma project development, design of investigation plan				
Learning outcomes: Student has studied the theoretical background, formulates research questions, has designed investigation plan, has presented first results, eventually.				
Brief outline of the course: Development of diploma project				
Recommended literature: Recommended literature that is included in the diploma thesis assignments Regulations for diploma thesis preparation template for diploma thesis				
Course language: Slovak				
Course assessment Total number of asses	Course assessment Total number of assessed students: 10			
	abs	n		
	100.0	0.0		
Provides:				
Date of last modifica	tion: 24.02.2017			
Approved: Guaranteedoc. PhDr. Anna Džambová, PhD.Guaranteeprof. PhDr. Oľga Orosová, CSc.				

University: P. J. Šafárik University in Košice					
Faculty: Faculty of A	Faculty: Faculty of Arts				
Course ID: ÚFV/ DPP2/14	Course name: Diploma Project II				
Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: present					
Number of credits: 2					
Recommended seme	ster/trimester of the cours	e: 2.			
Course level: II.					
Prerequisities:					
Conditions for course completion: regular consultaions with diploma thesis supervisor about the progress of diploma project development and about the investigation regular consultations study of available resources connected with the diploma thesis assignments first results					
Learning outcomes: Student understands the methods of investigation and he gains first results.					
Brief outline of the course: Work on the diploma project with regard to the assignemnts of the diploma thesis					
Recommended literature: Recommended literature that is included in the diploma thesis assignments Regulations for diploma thesis preparation template for diploma thesis					
Course language: Slovak					
Course assessment Total number of asses	ssed students: 10				
	abs	n			
	100.0	0.0			
Provides:					
Date of last modifica	ntion: 24.02.2017				
Approved: Guaranteedoc. PhDr. Anna Džambová, PhD.Guaranteeprof. PhDr. Oľga Orosová, CSc.					

University: P. J. Šafá	rik University in Košice			
Faculty: Faculty of A	rts			
Course ID: ÚFV/ DPP3/14	Ourse ID: ÚFV/ Course name: Diploma Project III PP3/14 PP3/14			
Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: present				
Number of credits: 2				
Recommended seme	ster/trimester of the cours	e: 3.		
Course level: II.				
Prerequisities:				
Conditions for cours regular consultations development and abo	Conditions for course completion: regular consultations with diploma thesis supervisor about the progress of diploma project development and about the project results			
Learning outcomes: Student has enough knowledge to prepare a theoretical part of the diploma thesis and for practical part based on the problem analysis and drawing conclusions.				
Brief outline of the course: Work on the project with regard to the diploma thesis assignments				
Recommended literature: Recommended literature that is included in the diploma thesis assignments Regulations for diploma thesis preparation template for diploma thesis				
Course language: Slovak				
Course assessment Total number of assessed students: 15				
	abs	n		
	100.0	0.0		
Provides:				
Date of last modifica	tion: 24.02.2017			
Approved: Guaranteedoc. PhDr. Anna Džambová, PhD.Guaranteeprof. PhDr. Oľga Orosová, CSc.				

University: P. J. Šafá	rik University in Košice
Faculty: Faculty of A	irts
Course ID: ÚFV/ FEP1/15	Course name: School Computer-Based Physical Laboratory
Course type, scope a Course type: Lectur Recommended cour Per week: 2 / 1 Per Course method: pre	nd the method: re / Practice rse-load (hours): study period: 28 / 14 esent
Number of credits: 3	
Recommended seme	ster/trimester of the course: 3.
Course level: II.	
Prerequisities:	
Conditions for cours The final assessment Test 30 points active participation 1 project (development points	the completion: is based on the sum of partial results 0 points to f mathematical model, videomeasurement and physical experiment) 60
Learning outcomes: After the course stud support active learnin with the help of datal processes. Student is learning and concept	ent gains an overview about the possible use of digital technologies to ng in physics. He gains skills to use and develop activities on measuring data ogging, measuring on videorecordings and picture and modeling physical able to implement such activities in physics teaching to support active ual understanding.
Brief outline of the c The aim of the cour in science with the h modeling tools. Math Within the course s measurement on the p of secondary school activities with regard	nourse: rese is to present the use of digital technologies to enhance active learning help of datalogging, videomeasurement, measurement from the picture and nematical modeling is based on dynamical modeling of physical phenomena. students carry out computer-based experiments, videomeasurements and picture and create corresponding models. The activities involve selected topics physics. The emphasize is put on the methods of implementation of the to active students' learning.
Recommended litera [1]Koubek, V., Pecen podporovanom labor [2]Príručka COACH [3]http://physedu.scie	nture: a, I.: Fyzikálne experimenty a modely v školskom mikropočítačom atóriu, Univerzita Komenského, Bratislava, 1999 ence.upjs.sk/sis/fyzika/experimenty/index.htm
Course language: Slovak	
Course assessment Total number of asse	ssed students: 7

А	В	С	D	E	FX
100.0	0.0	0.0	0.0	0.0	0.0
Provides: doc. RNDr. Zuzana Ješková, PhD.					
Date of last modification: 23.02.2017					
Approved: Guaranteedoc. PhDr. Anna Džambová, PhD.Guaranteeprof. PhDr. Oľga Orosová, CSc.					

University: P. J.	. Šafárik Univers	ity in Košice				
Faculty: Faculty	y of Arts					
Course ID: ÚF FKS/15	V/ Course na	ame: Solid State	Physics			
Course type, sc Course type: I Recommended Per week: 3 Pe Course metho	ope and the me Lecture d course-load (h er study period: d: present	thod: ours): 42				
Number of crea	lits: 3					
Recommended	semester/trimes	ster of the cours	e: 1.			
Course level: II	•					
Prerequisities:						
Conditions for oral examinatio	course completi n	on:				
Learning outco A general introd	mes: ductory course in	solid state physi	ics and material s	cience.		
Brief outline of Crystal structure in solids. There structure of sol superfluidity. M	Brief outline of the course: Crystal structures and methods of structure analysis. Defects in crystalline solids. Chemical bonding in solids. Thermal properties of crystal lattice. "Free" electrons in metals. The electronic band structure of solids. Transport phenomena in metals and semiconductors. Superconductivity and superfluidity Magnetic properties of solids. New problems of condensed matter physics.					
Recommended literature: H. Ibach, H. Lüth: Solid-State Physics. Springer - Verlag, Berlin, 1993. Ch. Kittel: Introduction to Solid State Physics. John Wiley & Sons, Inc. 1976.						
Course languag	Course language:					
Course assessment Total number of assessed students: 6						
А	В	С	D	Е	FX	
50.0	33.33	16.67	0.0	0.0	0.0	
Provides: Dr.h.c. prof. RNDr. Alexander Feher, DrSc., prof. RNDr. Peter Kollár, DrSc., prof. Ing. Martin Orendáč, CSc.						
Date of last mo	dification: 24.02	2.2017				
Approved: Guaranteedoc. PhDr. Anna Džambová, PhD.Guaranteeprof. PhDr. Oľga Orosová, CSc.						

University: P. J	. Šafárik Univers	sity in Košice				
Faculty: Faculty of Arts						
Course ID: ÚF FPK1/15	V/ Course na	ame: Phase Tran	sitions and Critic	cal Phenomena		
Course type, sc Course type: 1 Recommended Per week: 3 Pe Course metho	ope and the me Lecture d course-load (h er study period: d: present	thod: ours): 42				
Number of cree	dits: 3					
Recommended	semester/trimes	ster of the cours	se: 2.			
Course level: II	•					
Prerequisities:						
Conditions for Grade	course completi	on:				
Learning outco To acquaint stu	mes: dents with based	problems of the	phase transitions	s and critical pher	nomena.	
Brief outline of Thermodynami universality. M dimensions. Me	the course: cs of phase tran icroscopic mode can field theory c	sitions. Classifi ls of the magnet of the Ising mode	cation of phase tic phase transitie el. Landau theory	transitions. Critic ons. Ising model of phase transition	cal phenomena, in one and two ons.	
Recommended 1. Stanley H.G. Oxford, Oxford 2. Reichl L.E.: 3. Plischke M., 4. Kadanoff L.H Singapore, 200	literature: : Introduction to I, 1971. A Modern Cours Bergersen B.: Ec P.: Statistical Phy D.	Phase Transition e in Statistical P quilibrium Statis sics, Statistics, I	ns and Critical Ph hysics, Universit tical Physics, We Dynamics and Re	nenomena, Claren ty of Texas Press, orld Scientific, Sir enormalization, W	don Press Austin, 1980. ngapore, 1994. forld Scientific,	
Course languag Slovak	ge:					
Course assessm Total number o	ent f assessed studen	ts: 44				
A	В	С	D	E	FX	
72.73	72.73 9.09 4.55 6.82 6.82 0.0					
Provides: prof.	RNDr. Andrej B	obák, DrSc.	<u>.</u>		S	
Date of last mo	dification: 21.02	2.2017				
Approved: Gua	ranteedoc. PhDr	. Anna Džambov	vá, PhD.Guarante	eprof. PhDr. Ol'g	a Orosová, CSc.	

University: P. J. Šafárik University in Košice						
Faculty: Faculty of Arts						
Course ID: ÚFV/ FYU1/15	Course name: Physical Problems					
Course type, scope a Course type: Lectur Recommended cou Per week: 2 / 1 Per Course method: pro	and the method: re / Practice rse-load (hours): study period: 28 / 14 esent					
Number of credits: 3	3					
Recommended seme	ester/trimester of the course: 1.					
Course level: II.						
Prerequisities:						
Conditions for cours On- line set of proble seminar for testing o necessary. problem solving 40 p obtained problem 10 own problems 10 p oral examination 40 Final:	se completion: ems for self solving is avialable for students. One task is define for each f student preparation. Production and presentation of three own problems is p p					
A 100-90 B 89-80 C	79-70 D 69-60 E 59-50 F 49-0					
Learning outcomes: Students will be read school levels. Clasics knowledge anmd ski Brief outline of the o	y for using of problem solving strategies at lower and upper secondary al problems are studied in more details from different pont of view (students lls, technologies, motivation, computer modelling and measuremets).					
Uding of modelling a	solving are presented and trained. The sets of typical problems are analysed. and real experiments is discussed.					
Recommended litera 1.Baláž, P. : Zbierka 2.Bartuška,K: Postur I, Praha, Prometheus 3.Halpern, A.: 3000 4.Janovič,J., Koubek 5.Jurčová, M., Dohňa žiakov a študentov. E 6.Kružík, M.: Sbírka 7.Lindner, H.: Riešen 8.Linhart, J. (1976): Králové, MAFY, 199 9.Pietrasiński, Z. (19 Hradec Králové, MA	 nture: úloh z fyziky, SPN Bratislava, 1971 při řešení fyzikálních úloh, Sbírka řešených úloh z fyziky pro střední školy , 1997, s. 5-10. solved problems in Physics, McGraw-Hill, Inc., USA, 1988 ,V. Pecen,I.: Vybrané kapitoly z didaktiky fyziky. Bratislava, UK, 1999, anská, J., Pišút, J., Velmovská, K.: Didaktika fyziky – rozvíjanie tvorivosti Bratislava, UK, 2001, úloh z fyziky pro žáky strědních škol, SPN, Praha, 1984 né úlohy z fyziky, Alfa, Bratislava, 1973 In: Volf, I.: Metodika řešení úloh ve výuce fyziky na základní škole. Hradec 64): In: Volf, I.: Metodika řešení úloh ve výuce fyziky na základní škole. 					

10. Scholtz, E., Kireš, M.: Fyzika – kinematika pre gymnázia s osemročným štúdiom. Bratislava, SPN, 2001,

11. Šedivý, P., Volf, I.: Dopravní kinematika a grafy. Hradec Králové, MAFY, 1998.

12.Volf,I. (1975): In: Bednařík, M., Lepil, O.: Netradiční typy fyzikálních úloh. Praha, PROMETHEUS, 1995,

13. Volf,I.: Jak řešit úlohy fyzikální olympiády, XXIII. Ročník soutěze fyzikální olympiády ve školním roce 1981/82, Praha, SPN, 1981,

14. Volf,I.: Metodika řešení úloh ve výuce fyziky na základní škole. Hradec Králové, MAFY, 1998.

15.Halpern, A.: 3000 solved problems in Physics, McGraw-Hill, Inc., USA, 1988 16.http://kekule.science.upjs.sk/fyzika

17.http://physedu.science.upjs.sk

Course language:

Slovak, English

Course assessment

Total number of assessed students: 8

А	В	С	D	Е	FX
100.0	0.0	0.0	0.0	0.0	0.0

Provides: doc. RNDr. Marián Kireš, PhD., doc. RNDr. Zuzana Ješková, PhD.

Date of last modification: 23.02.2017

Approved: Guaranteedoc. PhDr. Anna Džambová, PhD.Guaranteeprof. PhDr. Oľga Orosová, CSc.

University: P. J. Šafa	University: P. J. Šafárik University in Košice					
Faculty: Faculty of A	Arts					
Course ID: ÚFV/ MDT06/15	Course name: Modern Didactical Technics					
Course type, scope a Course type: Pract Recommended cou Per week: 2 Per stu Course method: pr	and the method: ice irse-load (hours): udy period: 28 resent					
Number of credits:	2					
Recommended sem	ester/trimester of the course: 2.					
Course level: II.						
Prerequisities:						
Conditions for cour All assignments mus Active participation	se completion: st be uploaded and accepted be teacher. at seminar with minimum 80% participation.					
Student graduated fr - recognise basic too - to use all types of a - to design and realise Brief outline of the	om subject will be able: Is for teaching activities, actuall tools in science education, se educational activities by using modern technologies.					
 Didigital teacher's Digital imaging Digital image prod Digital audio prod Digital video prod Web cam and vide Interactive didacti Computer based r Digital technologi 	s workspace` cessing cessing coconferencing systems ical system (wideboard, voting system) neasurements ies in everyday life					
 Recommended literature: 1. Kireš, M. et al.: Modern didactical technics in teacher practice, Košice: Elfa, 2010, ISBN 788080861353 2. actuall information from web sites related to didactical technologies, 3. catalogues of teaching tools, 3. actuall articles about modern trends in science education. 						
Course language: Slovak, English						
Course assessment Total number of asse	essed students: 41					

А	В	С	D	Е	FX
29.27	48.78	12.2	4.88	4.88	0.0
Provides: doc. RNDr. Jozef Hanč, PhD.					
Date of last modification: 23.02.2017					
Approved: Guaranteedoc. PhDr. Anna Džambová, PhD.Guaranteeprof. PhDr. Oľga Orosová, CSc.					

University: P. J. Šafárik University in Košice							
Faculty: Faculty of A	Faculty: Faculty of Arts						
Course ID: ÚFV/ MFDF/15	Course name: Modern Physics from Didactics Point of View						
Course type, scope a Course type: Lectur Recommended cou Per week: 2 / 1 Per Course method: pro	and the method: re / Practice rse-load (hours): study period: 28 / 14 esent						
Number of credits: 3	3						
Recommended seme	ester/trimester of the course: 1.						
Course level: II.							
Prerequisities:							
Conditions for cours Active participation; project with a practic Exam and defending	se completion: completing reading assigments; realization of a chosen modern physics cal application. own project						
Learning outcomes: 1. Achieving better c ideas of contemprora have. Emphasis is no and tools of Physics employing only elem 2. Getting physical in physics.	onceptual understanding and getting an integrated view on fundamental ary modern physics, which every future physicist and physics teacher should at on abstract mathematical methods, but on using most recent knowledge Education Research - computer modeling of physical phenomena and mentary algebra and calculus. Intuition and experience dealing with practical applications of modern						
 Brief outline of the of 1. Fundamental idea principle of least active 2. Fundamental idea momenergy, metrics, 3. Fundamental idea histories, rules for a diagrams; practical a 	course: It is of modern mechanics: symmetry, event, worldlline, spacetime diagram, ion, conservation laws; practical applications. Its of relativity: principle of relativity, space-time interval, conservation of principle of maximal aging; practical applications. Its of quantum mechanics: probability amplitude, principle of democracy of implitudes, propagator, Schrödinger's equation, stationary state, Feynman's pplications.						
Recommended litera 1. Moore, T. A, Six I 2003 2. Feynman, R.P., QI Princeton, 1985 3. Hey, A., Walters, I 4. Taylor, E. F, Whee W.H. Freeman and C 5. Thorne, K. S., Bla 6. Relevant resources Journal of Physics, S	ature: deas That Shaped Physics - Unit C and Q, 2nd ed., Mc Graw Hill, Boston, ED - The Strange theory of Light and Matter, Princeton University Press, P., New Quantum Universe, Cambridge University Press, 2003 eler, J. A., Space-time Physics-Introduction to Special Relativity, 2nd ed., Company, New York, 1992 ck Holes and Time Warps, W.W. Norton, New York, 1995 s from recent journal literature (American Journal of Physics, European cientific American)						

Course language: Slovak						
Course assessment Total number of assessed students: 3						
А	В	С	D	Е	FX	
33.33	3.33 33.33 33.33 0.0 0.0 0.0					
Provides: doc. 1	Provides: doc. RNDr. Jozef Hanč, PhD.					
Date of last modification: 23.02.2017						
Approved: Gua	ranteedoc. PhDr.	Anna Džambova	á, PhD.Guarante	eprof. PhDr. Ol'g	a Orosová, CSc.	

University: P. J. Šafárik University in Košice								
Faculty: Faculty of Arts								
Course ID: ÚFV/ MPPb/15	Course name: Scheduled p	practice teaching						
Course type, scope a Course type: Practic Recommended cour Per week: Per stud Course method: pre	Course type, scope and the method: Course type: Practice Recommended course-load (hours): Per week: Per study period: 36s Course method: present							
Number of credits: 1								
Recommended seme	ster/trimester of the cours	e: 2.						
Course level: II.								
Prerequisities: KPE/	MPPa/15 and KPE/PDU/15	and (KPPaPZ/PaSPP/09 or KPPaPZ/PPgU/15)						
Conditions for cours Student observes 11 ₁ teacher trainer. Confi	e completion: physics lessons and leads on rmation of classroom visits.	e own physics lesson under the guidance of a Written assessment made by teacher trainer.						
Learning outcomes: Students acquire know the subject of physics first experience with	wledge by observing the pras and getting known about the teaching the subject of phys	ctical applications of teaching skills for teaching ne organization of school work. Studneets gain ics.						
Brief outline of the course: Students observe the process of teaching physics at lower and upper secondary schools and analyze it with teacher trainer. Practice takes place continuously durin the course of the semester. Practice is scheduled once a week at the time of the first to third lesson at schools. The first two lessons are observation/teaching, the third lesson - analysing the teaching process under the guidance of the teacher trainer.								
Recommended litera	iture:							
Course language: Slovak								
Course assessment Total number of assessed students: 61								
	abs n							
100.0 0.0								
Provides: doc. RNDr. Jozef Hanč, PhD.								
Date of last modifica	Date of last modification: 23.02.2017							
Approved: Guaranteedoc. PhDr. Anna Džambová, PhD.Guaranteeprof. PhDr. Oľga Orosová, CSc.								

University: P. J. Šafá	rik University in Košice					
Faculty: Faculty of A	Faculty: Faculty of Arts					
Course ID: ÚFV/ MPPc/15	Course name: Continuous	Practice Teaching I				
Course type, scope a Course type: Practic Recommended cour Per week: Per stud Course method: pre	nd the method: ce rse-load (hours): ly period: 4t esent					
Number of credits: 2						
Recommended seme	ster/trimester of the cours	e: 3.				
Course level: II.						
Prerequisities: ÚFV/	MPPb/15					
Conditions for course Confirmed list of sitter required extent of 6 le Lesson records and w	e completion: ings in on classes and teachi essons of sitting in on classe vritten preparation for the less	ng as a confirmation of attendance in the es and 18 physics lessons taught by student. ssons.				
Learning outcomes: Student gains under t Physics.	he guidance of teacher train	er practical teaching skills within the subject of				
Brief outline of the c Sitting in on classes, of observed and taug	ourse: teaching physics lessons by ht lessons.	v student, consulted with teacher trainer, analysis				
Recommended litera Textbooks for lower a	Recommended literature: Textbooks for lower and upper secondary school physics					
Course language: Slovak						
Course assessment Total number of assessed students: 8						
	abs n					
100.0 0.0						
Provides: doc. RNDr. Jozef Hanč, PhD.						
Date of last modification: 23.02.2017						
Approved: Guaranteedoc. PhDr. Anna Džambová, PhD.Guaranteeprof. PhDr. Oľga Orosová, CSc.						

University: P. J. Šafá	University: P. J. Šafárik University in Košice					
Faculty: Faculty of A	Faculty: Faculty of Arts					
Course ID: ÚFV/ MPPd/15	Course name: Continuous	Course name: Continuous Practice Teaching II				
Course type, scope a Course type: Practic Recommended cour Per week: Per stud Course method: pre	and the method: ce rse-load (hours): ly period: 6t esent					
Number of credits: 2	2					
Recommended seme	ster/trimester of the cours	e: 4.				
Course level: II.						
Prerequisities: ÚFV/	/MPPc/15					
Conditions for cours Confirmed list of sitt required extent of 8 1 Lesson records and w	Se completion: ings in on classes and teachi essons of sitting in on classe written preparation for the less	ng as a confirmation of attendance in the and 30 physics lessons taught by student. ssons.				
Learning outcomes: Student gains under t Physics.	he guidance of teacher train	er practical teaching skills within the subject of				
Brief outline of the c Sitting in on classes, of observed and taug	ourse: teaching physics lessons by ht lessons.	v student, consulted with teacher trainer, analysis				
Recommended litera Textbooks for lower	ature: and upper secondary school	physics				
Course language: Slovak						
Course assessment Total number of assessed students: 4						
	abs n					
100.0 0.0						
Provides: doc. RNDr. Jozef Hanč, PhD.						
Date of last modification: 23.02.2017						
Approved: Guaranteedoc. PhDr. Anna Džambová, PhD.Guaranteeprof. PhDr. Oľga Orosová, CSc.						

University: P. J.	Šafárik Univers	ity in Košice					
Faculty: Faculty	of Arts						
Course ID: ÚFV MSSU/15	Course ID: ÚFV/ Course name: Physics and Didactics of Physics MSSU/15						
Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: present							
Number of cred	lits: 1						
Recommended	semester/trimes	ster of the cours	e:				
Course level: II	•						
Prerequisities: (ASFU/15)	(ÚFV/DF1a/15 a	nd ÚFV/FKS/15	and ÚFV/SJF1/	/15 and ÚFV/DF	1b/15 and ÚFV/		
Conditions for of The graduate ha knowledge of pl selected physica	course completi as knowledge of hysics into educa al content.	on: physics in wider ation. He is able t	context. He is al to apply knowled	ole to implement dge of theory of e	and apply education to		
Learning outco Competencies in	mes: n accordance wit	h the graduate pr	ofile.				
 Brief outline of the course: The graduate has knowledge of physics in wider context. He is able to implement and apply knowledge of physics content into education. He is able to apply knowledge of theory of education to selected physical content. Physics: Selected problems of Solid state physics, Subnuclear physics and Astrophysics. Didactics of physics: State educational curriculum ISCED 2,3-Physics. Development of scientific literacy. Physical experiment. Active learning, inquiry-based education in physics. Formative and summative assessment. Talented students and informal education. Analysis of lower and upper secondary teaching units 							
Recommended literature:							
Course language: Slovak							
Course assessment Total number of assessed students: 4							
А	В	С	D	Е	FX		
75.0 25.0 0.0 0.0 0.0 0.0							
Provides:				•	•		
Date of last modification: 24.02.2017							
Approved: Gua	ranteedoc. PhDr.	Anna Džambov	á, PhD.Guarante	eprof. PhDr. Ol'g	ga Orosová, CSc.		

University: P. J.	Šafárik Univers	sity in Košice					
Faculty: Faculty	y of Arts						
Course ID: ÚF PSP1a/05	ÚFV/ Course name: School Physical Experiments I						
Course type, scope and the method: Course type: Practice Recommended course-load (hours): Per week: 3 Per study period: 42 Course method: present							
Number of crea	lits: 2						
Recommended	semester/trime	ster of the course	e: 1.				
Course level: II	•						
Prerequisities:							
Conditions for continuous writ being active in p final oral exami	course complet ten tests practises nation	ion:					
Learning outco To gain basic sk belonging to the familiar with di educational pro-	mes: tills with demon e subject matter i dactic procedure cess.	stration and physi in Physics classes s related to using	cs interpretation at basic school school experim	n of school physic s and high school nents in different p	cs experiments s. To become bhases of the		
Brief outline of The practices an experiments fro pupils. The emp school physics of	the course: the aimed at pract of selected topic thasis is on famil experiments and	ical realization an cs of the physics iarizing with teac on getting basic s	d physics interp subject matter hing aids and di skills with their	pretation of schoo for basic-school a dactic devices use utilization in phy	ol demonstration and high-school ed in performing sics teaching.		
Recommended literature: 1.Kašpar,E.,Vachek,J.: Pokusy z fyziky na středních školách, I.díl, SPN Praha,1967 2.Koubek, V. a kol.: Školské pokusy z fyziky, SPN Bratislava, 1992 3.http://physedu.science.upjs.sk/sis/fyzika/experimenty/index.htm							
Course language: Slovak							
Course assessment Total number of assessed students: 68							
A	A B C D E FX						
44.12 22.06 19.12 7.35 4.41 2.94							
Provides: doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Marián Kireš, PhD., PaedDr. Iveta Štefančínová, Ph.D.							
Date of last mo	dification: 23.02	2.2017					
Approved: Gua	ranteedoc. PhDr	. Anna Džambova	á, PhD.Guarante	eeprof. PhDr. Ol'g	a Orosová, CSc.		

University: P. J.	Šafárik Univers	sity in Košice					
Faculty: Faculty	v of Arts						
Course ID: ÚFV PSP1b/04	ÚFV/ Course name: School Physical Experiments II						
Course type, scope and the method: Course type: Practice Recommended course-load (hours): Per week: 3 Per study period: 42 Course method: present							
Number of cred	lits: 2						
Recommended	semester/trime	ster of the course	e: 2.				
Course level: II							
Prerequisities:							
Conditions for of continuous write being active in p final oral examin	course complet ten tests practises nation	ion:					
Learning outco Students should techniques and j of the subject m	mes: gain knowledge ohysical interpre atter in physics	e and broaden skil stations of all type classes at basic ar	lls necessary for es of school phys nd high schools.	understanding m sical experiments	ethods, that are parts		
Brief outline of The practises ar experiments fro and their conver teaching aids an skills with their	Brief outline of the course: The practises are aimed at practical realization and physics interpretation of school demonstration experiments from selected topics of the physics subject matter for basic- and high-school pupils and their convenient incorporation into educational process. The emphasis is on familiarizing with teaching aids and didactic devices used in performing school physics experiments and on extending skills with their utilization in physics teaching.						
Recommended literature: 1.Onderová, Ľ., Kireš, M., Ješková, Z., Degro, J.: Praktikum školských pokusov z fyziky II., PF UPJŠ 2.Kašpar, E., Vachek, J.: Pokusy z fyziky na středních školách, I. díl, SPN Praha, 1967 3.Žouželka,, J., Fuka, J.: Pokusy z fyziky na středních školách, II. díl, SPN Praha, 1971 4.http://physedu.science.upjs.sk/sis/fyzika/experimenty/index.htm							
Course language: Slovak							
Course assessment Total number of assessed students: 64							
A B C D E FX							
51.56	10.94	29.69	4.69	1.56	1.56		
Provides: doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Marián Kireš, PhD., PaedDr. Iveta Štefančínová, Ph.D.							

Date of last modification: 23.02.2017

Approved: Guaranteedoc. PhDr. Anna Džambová, PhD.Guaranteeprof. PhDr. Oľga Orosová, CSc.

University: P. J. Ša	ıfárik Univers	ity in Košice				
Faculty: Faculty of	f Arts					
Course ID: ÚFV/ SJF1/15	D: ÚFV/ Course name: Subnuclear Physics					
Course type, scope Course type: Lec Recommended co Per week: 2 Per s Course method: p	e and the met ture ourse-load (h study period: present	hod: ours): 28				
Number of credits	:2					
Recommended ser	nester/trimes	ter of the course	e: 2.			
Course level: II.						
Prerequisities:						
Conditions for cou written test and the exam	irse completi esis	on:				
Learning outcome Preview of basic cl theoretical descript	s: haracteristics tion and exper	and classification	of elementary ple.	particles, their str	uctures,	
Brief outline of the Historical introduc particlesClassifica	e course: etion to the partic	article physics. T les. Symmetrics	The forces in na and conservation	ture. Elementary n laws. Standard	and composite model.	
 Recommended literature: 1. Close F.: The Cosmic Onion - Quarks and the Nature of the Universe, Oxford, 1990. 2. Hajko V. and team of authors, Physics in experiments, Bratislava, 1997. 3. Kapitonov I.M., Vvedenije v fiziku jadra i chastic (Russian), Moscow, 2004. 4. Brandt S., The harvest of a century, Discoveries of modern physics in 100 episodes, Oxford, 2009. 						
Course language: Slovak						
Course assessment Total number of assessed students: 31						
A	В	С	D	E	FX	
32.26 0.0 6.45 25.81 25.81 9.68						
Provides: prof. RN	Provides: prof. RNDr. Stanislav Vokál, DrSc.					
Date of last modifi	ication: 20.02	2.2017				
Approved: Guaran	teedoc. PhDr.	Anna Džambova	á, PhD.Guarante	eprof. PhDr. Ol'g	a Orosová, CSc.	

University: P. J	. Šafárik Univer	sity in Košice				
Faculty: Facult	y of Arts					
Course ID: ÚF SVKD/04	// Course name: Student Scientific Conference					
Course type, so Course type: Recommende Per week: Pe Course metho	cope and the m d course-load (r study period: od: present	ethod: hours):				
Number of cre	dits: 4					
Recommended	semester/trim	ester of the cours	se:			
Course level: I	[
Prerequisities:						
Conditions for presentation of	course comple results of studn	tion: ets´ research worl	c at Students' sc	ientific conferenc	e	
Learning outco Student gains e	omes: xperience and s	kills in processing	g and presentation	on of results of his	s research work.	
Brief outline of Presentation of	f the course: results of studn	ets' research worl	k at Students' sc	eientific conferenc	e.	
Recommended Based on the re	literature:	s of supervisor				
Course langua Slovak	ge:					
Course assessment Total number of assessed students: 45						
А	В	С	D	E	FX	
100.0	100.0 0.0 0.0 0.0 0.0					
Provides:						
Date of last mo	dification: 23.0	02.2017				
Approved: Gua	aranteedoc. PhD	r. Anna Džambov	vá, PhD.Guarant	eeprof. PhDr. Ol'g	ga Orosová, CSc.	

University: P. J. Šafărik University in Košice Faculty: Faculty of Arts Course ID: ÚFV/ TRS/15 Course type: Lecture Recommended course-load (hours): Per week: 2 Per study period: 28 Course type: Lecture Recommended semester/trimester of the course: 3. Course level: II. Prerequisities: Conditions for course completion: Learning outcomes: To acquaint students with principles of a special theory of relativity. Lorentz transformation and its physical consequences. Interval and light cone. Proper time. Minkowski's space-time. Mathematical apparatus of special relativity. Relativistic electrodynamics. Relativistic mechanics. Recommended literature: I. Greiner W:: Classical Mechanics-Point Particles and Relativity, Springer-Verlag, New York, 2004. 2. Goldstein H., Poole Ch., Safko J.: Classical Mechanics, Addison Wesley, San Francisco, 2002. 3. Landau L.D., Lifšic E.M.: The Classical Mechanics, Addison Wesley, San Francisco, 2002. 3. Landau L.D., Lifšic E.M.: The Classical Theory of Fields, Pergamon Press, Oxford, 1975. Course assessment Total number of assessed students: 42 A B C D E FX 33.33 40.48 9.52 9.52 7.14 0.0 Provides: prof. RNDr. Andrej Bobák, DrSc. Date of last modification: 21.02.2017 Approved: Guaranteedoc. PhDr. Anna Džambová, PhD.Guaranteeprof. PhDr. Ofga Orosová, CSc.						
Faculty: Faculty of Arts Course ID: ÚFV/ TRS/15 Course name: Special Theory of Relativity TRS/15 Course type, scope and the method: Course type. Lecture Recommended course-load (hours): Per week: 2 Per study period: 28 Course method: present Recommended semester/frimester of the course: 3. Number of credits: 2 Recommended semester/trimester of the course: 3. Course level: II. Prerequisities: Course completion: Learning outcomes: To acquaint students with principles of a special theory of relativity. Brief outline of the course: Galilean principles of relativity. Ether's hypothesis. Michelson experiment. Einstein's principles of the special theory of relativity. Lerentz transformation and its physical consequences. Interval and light cone. Proper time. Minkowski's space-time. Mathematical apparatus of special relativity. Relativistic electrodynamics. Relativistic mechanics. Recommended literature: 1. Greiner W.: Classical Mechanics-Point Particles and Relativity, Springer-Verlag, New York, 2004. Safko J.: Classical Mechanics, Addison Wesley, San Francisco, 2002. 3. Landau L.D., Lifšic E.M.: The Classical Theory of Fields, Pergamon Press, Oxford, 1975. Course language: Slovak Course assessment Total number of assessed students: 42 A B C D E FX 33.33 40.48 9.52 9.52 7.14 0.0 Provides: prof. RNDr. Andrej Bobák, DrSc. Date of last modification: 21.02.2017 A B	University: P. J	. Šafárik Univer	sity in Košice			
Course nome: Special Theory of Relativity TRS/15 Course type, scope and the method: Course type, scope and the method: Course type: Lecture Recommended course-load (hours): Per week: 2 Per study period: 28 Course method: present Number of credits: 2 Recommended semester/trimester of the course: 3. Course level: II. Prerequisities: Conditions for course completion: Learning outcomes: To acquaint students with principles of a special theory of relativity. Brief outline of the course: Galilean transformations and Galilean principle of relativity. Lorentz transformation and its physical consequences. Interval and light cone. Proper time. Minkowski's space-time. Mathematical apparatus of special relativity. Relativistic electrodynamics. Relativitistic mechanics. Recommended literature: 1. Greiner W.: Classical Mechanics-Point Particles and Relativity, Springer-Verlag, New York, 2004. 2. Goldstein H., Poole Ch., Safko J.: Classical Mechanics, Addison Wesley, San Francisco, 2002. 3. Landau L.D., Lifsic E.M.: The Classical Theory of Fields, Pergamon Press, Oxford, 1975. Course assessment Total number of assessed students: 42 A B C D E FX 33.33 40.48 9.52 9.52 7.14 0.0 Provides: prof. RNDr. Andrej Bobák, DrSc. Date of last modification: 21.02.2017 A B C D E FX 33.33 40.48 9.52 9.52 7.14 0.0	Faculty: Facult	y of Arts				
Course type, scope and the method: Course type: Lecture Recommended course-load (hours): Per week: 2 Per study period: 28 Course method: present Number of credits: 2 Recommended semester/trimester of the course: 3. Course level: II. Prerequisities: Conditions for course completion: Learning outcomes: To acquaint students with principles of a special theory of relativity. Brief outline of the course: Galilean transformations and Galilean principle of relativity. Lorentz transformation and its physical consequences. Interval and light cone. Proper time. Minkowski's space-time. Mathematical apparatus of special relativity. Relativistic electrodynamics. Relativistic mechanics. Recommended literature: 1. Greiner W.: Classical Mechanics-Point Particles and Relativity, Springer-Verlag, New York, 2004. 2. Goldstein H., Poole Ch., Safko J.: Classical Mechanics, Addison Wesley, San Francisco, 2002. 3. Landau L.D., Lifšic E.M.: The Classical Theory of Fields, Pergamon Press, Oxford, 1975. Course language: Slovak Course assessment Total number of assessed students: 42 A B C D E FX 3.3.3 40.48 9.52 9.52	Course ID: ÚF TRS/15	urse ID: ÚFV/ Course name: Special Theory of Relativity S/15				
Number of credits: 2 Recommended semester/trimester of the course: 3. Course level: II. Prerequisities: Conditions for course completion: Learning outcomes: To acquaint students with principles of a special theory of relativity. Brief outline of the course: Galilean transformations and Galilean principle of relativity. Ether's hypothesis. Michelson experiment. Einstein's principles of the special theory of relativity. Lorentz transformation and its physical consequences. Interval and light cone. Proper time. Minkowski's space-time. Mathematical apparatus of special relativity. Relativistic electrodynamics. Relativistic mechanics. Recommended literature: 1. Greiner W.: Classical Mechanics-Point Particles and Relativity, Springer-Verlag, New York, 2004. 2. Goldstein H., Poole Ch., Safko J.: Classical Mechanics, Addison Wesley, San Francisco, 2002. 3. Landau L.D., Lifšic E.M.: The Classical Theory of Fields, Pergamon Press, Oxford, 1975. Course language: Slovak Course assessment Total number of assessed students: 42 A B C D E A B C A B C A B C A B C A <td>Course type, so Course type: Recommended Per week: 2 P Course metho</td> <td>cope and the mo Lecture d course-load (l er study period od: present</td> <td>ethod: hours): : 28</td> <td></td> <td></td> <td></td>	Course type, so Course type: Recommended Per week: 2 P Course metho	cope and the mo Lecture d course-load (l er study period od: present	ethod: hours): : 28			
Recommended semester/trimester of the course: 3. Course level: II. Prerequisities: Conditions for course completion: Learning outcomes: To acquaint students with principles of a special theory of relativity. Brief outline of the course: Galilean transformations and Galilean principle of relativity. Lorentz transformation and its physical consequences. Interval and light cone. Proper time. Minkowski's space-time. Mathematical apparatus of special relativity. Relativistic electrodynamics. Relativistic mechanics. Recommended literature: 1. Greiner W.: Classical Mechanics-Point Particles and Relativity, Springer-Verlag, New York, 2004. 2. Goldstein H., Poole Ch., Safko J.: Classical Mechanics, Addison Wesley, San Francisco, 2002. 3. Landau L.D., Lifšic E.M.: The Classical Theory of Fields, Pergamon Press, Oxford, 1975. Course language: Slovak C D E FX 33.33 40.48 9.52 9.52 7.14 0.0 Provides: prof. RNDr. Andrej Bobák, DrSc. Date of last modification: 21.02.2017 A pproved: Guaranteedoc. PhDr. Anna Džambová, PhD.Guaranteeprof. PhDr. Oľga Orosová, CSc.	Number of cree	dits: 2				
Course level: II. Prerequisities: Conditions for course completion: Learning outcomes: To acquaint students with principles of a special theory of relativity. Brief outline of the course: Galilean transformations and Galilean principle of relativity. Ether's hypothesis. Michelson experiment. Einstein's principles of the special theory of relativity. Lorentz transformation and its physical consequences. Interval and light cone. Proper time. Minkowski's space-time. Mathematical apparatus of special relativity. Relativistic electrodynamics. Relativistic mechanics. Recommended literature: 1. Greiner W.: Classical Mechanics-Point Particles and Relativity, Springer-Verlag, New York, 2004. 2. Goldstein H., Poole Ch., Safko J.: Classical Mechanics, Addison Wesley, San Francisco, 2002. 3. Landau L.D., Lifšic E.M.: The Classical Theory of Fields, Pergamon Press, Oxford, 1975. Course language: Slovak Course assessment Total number of assessed students: 42 A B C D E FX 33.33 40.48 9.52 9.52 7.14 0.0 Provides: prof. RNDr. Andrej Bobák, DrSc. D E FX Date of last modification: 21.02.2017 Approved: Guaranteedoc. PhDr. Anna Džambová, PhD.Guaranteeprof. PhDr. Ol'ga Orosová,	Recommended	semester/trime	ester of the cours	se: 3.		
Prerequisities: Conditions for course completion: Learning outcomes: To acquaint students with principles of a special theory of relativity. Brief outline of the course: Galilean transformations and Galilean principle of relativity. Ether's hypothesis. Michelson experiment. Einstein's principles of the special theory of relativity. Lorentz transformation and its physical consequences. Interval and light cone. Proper time. Minkowski's space-time. Mathematical apparatus of special relativity. Relativistic electrodynamics. Relativistic mechanics. Recommended literature: 1. Greiner W.: Classical Mechanics-Point Particles and Relativity, Springer-Verlag, New York, 2004. 2. Goldstein H., Poole Ch., Safko J.: Classical Mechanics, Addison Wesley, San Francisco, 2002. 3. Landau L.D., Lifšic E.M.: The Classical Theory of Fields, Pergamon Press, Oxford, 1975. Course language: Slovak Slovak Slovak C D E A B C D E FX 33.33 40.48 9.52 9.52 7.14 0.0 Provides: prof. RNDr. Andrej Bobák, DrSc. Date of last modification: 21.02.2017 Approved: Guaranteedoc. PhDr. Anna Džambová, PhD.Guaranteepro	Course level: I	[.				
Conditions for course completion: Learning outcomes: To acquaint students with principles of a special theory of relativity. Brief outline of the course: Galilean transformations and Galilean principle of relativity. Ether's hypothesis. Michelson experiment. Einstein's principles of the special theory of relativity. Lorentz transformation and its physical consequences. Interval and light cone. Proper time. Minkowski's space-time. Mathematical apparatus of special relativity. Relativistic electrodynamics. Relativistic mechanics. Recommended literature: 1. Greiner W.: Classical Mechanics-Point Particles and Relativity, Springer-Verlag, New York, 2004. 2. Goldstein H., Poole Ch., Safko J.: Classical Mechanics, Addison Wesley, San Francisco, 2002. 3. Landau L.D., Lifšic E.M.: The Classical Theory of Fields, Pergamon Press, Oxford, 1975. Course language: Slovak Course assessment Total number of assessed students: 42 A B C D E FX Addition: 21.02.2017 Approved: Guaranteedoc. PhDr. Anna Džambová, PhD.Guaranteeprof. PhDr. Ofga Orosová, CSc.	Prerequisities:					
Learning outcomes: To acquaint students with principles of a special theory of relativity. Brief outline of the course: Galilean transformations and Galilean principle of relativity. Ether's hypothesis. Michelson experiment. Einstein's principles of the special theory of relativity. Lorentz transformation and its physical consequences. Interval and light cone. Proper time. Minkowski's space-time. Mathematical apparatus of special relativity. Relativistic electrodynamics. Relativistic mechanics. Recommended literature: 1. Greiner W.: Classical Mechanics-Point Particles and Relativity, Springer-Verlag, New York, 2004. 2. Goldstein H., Poole Ch., Safko J.: Classical Mechanics, Addison Wesley, San Francisco, 2002. 3. Landau L.D., Lifšic E.M.: The Classical Theory of Fields, Pergamon Press, Oxford, 1975. Course language: Slovak Slovak Volume Course assessment Total number of assessed students: 42 A B C D E FX 33.33 40.48 9.52 9.52 7.14 0.0 Provides: prof. RNDr. Andrej Bobák, DrSc. D E FX Date of last modification: 21.02.2017 Approved: Guaranteedoc. PhDr. Anna Džambová, PhD.Guaranteeprof. PhDr. Ofga Orosová, CSc.	Conditions for	course complet	ion:			
Brief outline of the course: Galilean principle of relativity. Ether's hypothesis. Michelson experiment. Einstein's principles of the special theory of relativity. Lorentz transformation and its physical consequences. Interval and light cone. Proper time. Minkowski's space-time. Mathematical apparatus of special relativity. Relativistic electrodynamics. Relativistic mechanics. Recommended literature: 1. Greiner W.: Classical Mechanics-Point Particles and Relativity, Springer-Verlag, New York, 2004. 2. Goldstein H., Poole Ch., Safko J.: Classical Mechanics, Addison Wesley, San Francisco, 2002. 3. Landau L.D., Lifšic E.M.: The Classical Theory of Fields, Pergamon Press, Oxford, 1975. Course language: Slovak Course assessment Total number of assessed students: 42 A B C D E FX 33.33 40.48 9.52 9.52 7.14 0.0 Provides: prof. RNDr. Andrej Bobák, DrSc. Date of last modification: 21.02.2017 Approved: Guaranteedoc. PhDr. Anna Džambová, PhD.Guaranteeprof. PhDr. Oľga Orosová, CSc.	Learning outco To acquaint stu	omes: dents with princ	iples of a special	theory of relativ	ity.	
Recommended literature: 1. Greiner W.: Classical Mechanics-Point Particles and Relativity, Springer-Verlag, New York, 2004. 2. Goldstein H., Poole Ch., Safko J.: Classical Mechanics, Addison Wesley, San Francisco, 2002. 3. Landau L.D., Lifšic E.M.: The Classical Theory of Fields, Pergamon Press, Oxford, 1975. Course language: Slovak Course assessment Total number of assessed students: 42 A B C D E FX 33.33 40.48 9.52 9.52 7.14 0.0 Provides: prof. RNDr. Andrej Bobák, DrSc. Date of last modification: 21.02.2017 Approved: Guaranteedoc. PhDr. Anna Džambová, PhD.Guaranteeprof. PhDr. Oľga Orosová, CSc.	experiment. Ein physical conseq apparatus of sp	stein's principle uences. Interval ecial relativity. I	es of the special the and light cone. Pre- Relativistic electro	heory of relativity roper time. Mink odynamics. Rela	ty. Lorentz transf owski's space-tim tivistic mechanic	Sormation and its ne. Mathematical s.
Course language: Slovak Course assessment Total number of assessed students: 42 A B C D E FX 33.33 40.48 9.52 9.52 7.14 0.0 Provides: prof. RNDr. Andrej Bobák, DrSc. Date of last modification: 21.02.2017 Approved: Guaranteedoc. PhDr. Anna Džambová, PhD.Guaranteeprof. PhDr. Oľga Orosová, CSc.	Recommended 1. Greiner W.: 0 2004. 2. Goldstein H. 3. Landau L.D.	literature: Classical Mecha , Poole Ch., Safi , Lifšic E.M.: Tl	nics-Point Particl ko J.: Classical M ne Classical Theo	es and Relativity fechanics, Addis ry of Fields, Per	y, Springer-Verlag on Wesley, San F gamon Press, Ox	g, New York, Francisco, 2002. ford, 1975.
Course assessment Total number of assessed students: 42ABCDEFX33.3340.489.529.527.140.0Provides: prof. RNDr. Andrej Bobák, DrSc.Date of last modification: 21.02.2017Approved: Guaranteedoc. PhDr. Anna Džambová, PhD.Guaranteeprof. PhDr. Oľga Orosová, CSc.	Course langua Slovak	ge:				
ABCDEFX33.3340.489.529.527.140.0Provides: prof. RNDr. Andrej Bobák, DrSc.Date of last modification: 21.02.2017Approved: Guaranteedoc. PhDr. Anna Džambová, PhD.Guaranteeprof. PhDr. Oľga Orosová, CSc.	Course assessment Total number of assessed students: 42					
33.3340.489.529.527.140.0Provides: prof. RNDr. Andrej Bobák, DrSc.Date of last modification: 21.02.2017Approved: Guaranteedoc. PhDr. Anna Džambová, PhD.Guaranteeprof. PhDr. Oľga Orosová, CSc.	A	В	С	D	Е	FX
 Provides: prof. RNDr. Andrej Bobák, DrSc. Date of last modification: 21.02.2017 Approved: Guaranteedoc. PhDr. Anna Džambová, PhD.Guaranteeprof. PhDr. Oľga Orosová, CSc. 	33.33	40.48	9.52	9.52	7.14	0.0
Date of last modification: 21.02.2017 Approved: Guaranteedoc. PhDr. Anna Džambová, PhD.Guaranteeprof. PhDr. Oľga Orosová, CSc.	Provides: prof. RNDr. Andrej Bobák, DrSc.					
Approved: Guaranteedoc. PhDr. Anna Džambová, PhD.Guaranteeprof. PhDr. Oľga Orosová, CSc.	Date of last mo	dification: 21.0	2.2017			
	Approved: Gua	aranteedoc. PhD	r. Anna Džambov	á, PhD.Guarant	eeprof. PhDr. Ol'g	ga Orosová, CSc.

University: P. J. Šaf	ărik University in Košice				
Faculty: Faculty of	Arts				
Course ID: ÚFV/ VBF2/15	ÚFV/ Course name: General Biophysics II				
Course type, scope and the method: Course type: Lecture Recommended course-load (hours): Per week: 3 Per study period: 42 Course method: present					
Number of credits:	3				
Recommended sem	ester/trimester of the course: 1., 3.				
Course level: II.					
Prerequisities:					
Conditions for cour Exam	rse completion:				

Learning outcomes:

To provide information about the object, significance and role of biophysics in science. The main emphasis will be given on the understanding of the principles determining the structure and function of the most important biological structures (nucleis acids, proteins, biomembranes) as well as on the thermodynamics and kinetics of selected chemical and biophysical processes.

Brief outline of the course:

The definition of biophysics and its role in the science. Intra- and inter-molecular interactions in biological systems. Function and structure of the important biomacromolecules (nucleic acids, proteins, biomembranes, sugars). Conformational transitions in biopolymers: helix-coil transition in DNA, denaturation of proteins, phase transitions in biomembranes.

Thermodynamics of biological processes. Gibbs energy and chemical equilibrium, chemical potential, binding constants of the ligand-macromolecule intractions, cooperativity of the binding between biological important molecules, membrane potential.

Kinetics of the chemical and biophysical processes. The principles of chemical kinetics, enzymatic reactions, inhibition of the enzymes, membrane transport, introduction to the pharmacokinetics.

Cell biophysics. The basic bioenergetic processes, oxidative phosphorylation, photosynthesis. Mechanisms of regulations and control processes in cells-the basic principles.

Medicinal biophysics. Biophysical principles of selected diagnostic and therapeutical methods. Radiation and environmental biophysics. The influence of physico-chemical factors of the environment on the living systems.

Recommended literature:

1. M. B. Jackson, Molecular and cellular biophysics, Cambridge University Press, 2006.

2. M. Daune, Molecular biophysics-Structures in motion, Oxford

University Press, 2004.

- 3. R. Glaser, Biophysics, Springer Verlag, 2001.
- 4. M.V. Volkenštein, Biofizika, Nauka, Moskva 1988.
- 5. W.Hoppe and W. Lohmann, Biophysics, Springer Verlag, 1988.
- 6. K.E.van Holde, W.C. Johnson and P. Shing Ho, Principles of

physical biochemistry, Simon and Schuster, Prentice Hall, 1998.7. D.G. Nichols and S.J. Ferguson, Bioenergetics 3, Academic Press, Elsevier Science Ltd., 2002.						
Course language: Slovak						
Course assessment Total number of assessed students: 9						
А	В	С	D	Е	FX	
22.22	44.44	11.11	11.11	11.11	0.0	
Provides: doc. Mgr. Daniel Jancura, PhD.						
Date of last modification: 24.02.2017						
Approved: Guaranteedoc. PhDr. Anna Džambová, PhD.Guaranteeprof. PhDr. Oľga Orosová, CSc.						

University: P. J. Šafá	rik University in Košice
Faculty: Faculty of A	ints
Course ID: ÚFV/ VMV1/15	Course name: Using Multimedia in Education
Course type, scope a Course type: Lectur Recommended cour Per week: 2 / 1 Per Course method: pre	nd the method: re / Practice rse-load (hours): study period: 28 / 14 esent
Number of credits: 3	·
Recommended seme	ster/trimester of the course: 3.
Course level: II.	
Prerequisities:	
Conditions for cours 9. moduls assignment presentation and disc A 100-90 B 89-80 C	e completion: ts: 45 points ussion about the project 55 points 79-70 D 69-60 E 59-50 F 49-0
Learning outcomes: Studenat will have ov	verview and skills in field of using multimedia in education.
Brief outline of the c 1. Computer graphics 2. Preparation and us 3. Computer animatic 4. Digital audio and e 5. Educational video 6. Interactive multime 7. Videotechnologies 8. Computer based sc 9. Interactove acitvite 10. Educational proje 11. Educational proje 12. Project presentati	ourse: as visualisation tools ing of graphic elements on educational activities edia in education chool laboratory es in multimedia classroom ect creation on
Recommended litera 1. Kireš, M, Šnajden Bratislava 2002, 96 s 2. Kireš, M. a kol.: Ik strán, 400 ks, ISBN 8 3. Šnajder, Ľ., Kireš, Bratislava, 2005, 48 s mutácia: ISBN 80-10	 ture: E., Kalakay, R.: Multimédiá pre učiteľa, Asociácia projektu Infovek, UIPŠ trán, 400 ks, ISBN 80-7098-317-5 KT pre učiteľa fyziky, Asociácia projektu Infovek, UIPŠ Bratislava 2002, 79 60-7098-316-7 M.: Práca s multimédiami pre stredné školy, tematický zošit, SPN strán, 1. vydanie: ISBN 80-10-00422-7, 2006, 1.vydanie maďarská jazyková 0-01031-6, 2007, 2.vydanie: ISBN 978-80-10-01224-4
Course language: Slovak, English	

Course assessment

Total number of assessed students: 0						
А	В	С	D	Е	FX	
0.0 0.0 0.0 0.0 0.0 0.0						
Provides: doc. RNDr. Marián Kireš, PhD.						
Date of last modification: 23.02.2017						
Approved: Guaranteedoc. PhDr. Anna Džambová, PhD.Guaranteeprof. PhDr. Oľga Orosová, CSc.						

University: P. J. Šafá	rik University in Košice							
Faculty: Faculty of A	Faculty: Faculty of Arts							
Course ID: ÚFV/ VPF1/15	Course name: Selected General Physics Problems I							
Course type, scope a Course type: Lectur Recommended cou Per week: 3 Per stu Course method: pro	ind the method: re rse-load (hours): idy period: 42 esent							
Number of credits: 3	3							
Recommended seme	ester/trimester of the course: 2.							
Course level: II.								
Prerequisities:								
Conditions for course 1. writing exam 20 p 2. writing exam 20 p self examples 30 bod semestral presentation A 100-90 B 89-80 C	se completion: oints oints lov n 30 bodov 79-70 D 69-60 E 59-50 F 49-0							
Learning outcomes: Physics interpretation problems.	of of everyday phenomena can help with deeper understanding of physics							
Brief outline of the of 1. Kinematics and dy 2. Hydrostatics and h 3. Surface properties 4. Thermics and The 5. Thermics and The 6. Electrostatics 7. Electric field 8. Magnetic field 9. Mechanical oscilla 10. Acoustics 11. Ray Optics 12. Wave Optics 13. Student assignment	rourse: namics lydrodynamics of liquids rmodynamics rmodynamics II attions, resonance, waves							
Recommended litera 1.Nahodil, J.: Fyzika 2.Tulčinskyj, : Zbierl 3.Kašpar, E. : Problé 4.Feynman, R.P. : Fe 5.Landau, Kitajgorod 6.Lange, V.: To chce 7.http://kekule.sciend	v bežnom živote, Prometheus, Praha, 1996 ka kvalitatívnych úloh z fyziky, SPN, Bratislava, 1990 mové vyučovanie a problémové úlohy, SPN, Praha1982 ynmanove prednášky z fyziky 1-5, Alfa, 1985 lskij : Fyzika pre každého, Alfa 1972 vtip!, Alfa, Bratislava, 1988 ce.upjs.sk/fyzika							

8.http://physed	u.science.upjs.sk				
Course langua Slovak, English	ge: 1				
Course assessn Total number o	nent f assessed student	ts: 6			
А	В	С	D	Е	FX
100.0	0.0	0.0	0.0	0.0	0.0
Provides: doc. RNDr. Marián Kireš, PhD.					
Date of last mo	dification: 23.02	.2017			
Approved: Gua	aranteedoc. PhDr.	Anna Džambov	vá, PhD.Guarante	eprof. PhDr. Ol'g	ga Orosová, CSc.

University: P. J. Safaril	k University in Kosice
Faculty: Faculty of Art	S
Course ID: ÚFV/ VPF2/15	Course name: Selected General Physics Problems II
Course type, scope and Course type: Lecture Recommended cours Per week: 3 Per study Course method: prese	d the method: e-load (hours): y period: 42 ent
Number of credits: 3	
Recommended semest	er/trimester of the course: 3.
Course level: II.	
Prerequisities:	
Conditions for course presentation of selected writing exam 70 p A 100-90 B 89-80 C 79	completion: 1 problem 30 p 9-70 D 69-60 E 59-50 F 49-0
Learning outcomes: Everyday phenomena a	are used for deeper and conceptual understanding of physics problem.
 1.Mechanics Coriolisova force How Swing works Bicycle Tides Inertia 2.Hydromechanics Archimedes screw Water flow Archimedes principle 3.Kapilarity Water in plant Kapilár hysteresis Bubbles and soap Floating on water surf 4.Acoustic Signal production Human voice Space acoustic Home ciname 5.Optics Sight Opticalillusions 	in Action `ace

 Atmospheric acoustic 6.Probléms IYPT Magnetohydrodynamics Bulbs Falling spring Ship movement Thermal exchange 7.Differenct problems Sonoluminiscence Ice pick Kelvin water droplet Water stain 8.Student work presentation 							
 Recommended literature: 1. Walker, J.: The Flying Circus of Physics with answers, John Wiley &Sons, 2005 2. Gnädig, P., Honyek, G., Riley, K.: 200 Puzzling Physics Problems with Hints and Solutions, Cambridge University Press, 2001 3. Stepans, J.: Targeting Studnets ` Misconceptions, Showboard, 2003 4. Swartz, C.: Back of the Envelope Physics, The John Hopkins Uni. Press, Baltimore, 2003 5. Nahodil, J.: Fyzika v bežnom živote, Prometheus, Praha, 1996 6. Tulčinskyj, : Zbierka kvalitatívnych úloh z fyziky, SPN, Bratislava, 1990 7. Kašpar, E. : Problémové vyučovanie a problémové úlohy, SPN, Praha1982 8. Feynman, R.P. : Feynmanove prednášky z fyziky 1-5, Alfa, 1985 9. Landau, Kitajgorodskij : Fyzika pre každého, Alfa 1972 10. Lange, V.: To chce vtip!, Alfa, Bratislava, 1988 actual articles 							
Course language: Slovak, English							
Course assessment Total number of assessed students: 4							
А	В	С	D	E	FX		
100.0	0.0	0.0	0.0	0.0	0.0		
Provides: doc. RNDr. Marián Kireš, PhD.							
Date of last modification: 23.02.2017							
Approved: Guaranteedoc. PhDr. Anna Džambová, PhD.Guaranteeprof. PhDr. Oľga Orosová, CSc.							

University: P. J. Šafárik University in Košice						
Faculty: Faculty of Arts						
Course ID: ÚFV/ VPSP/04	Course name: School Physics Experiments III					
Course type, scope and the method: Course type: Practice Recommended course-load (hours): Per week: 3 Per study period: 42 Course method: present						
Number of credits:	3					
Recommended sem	ester/trimester of the course: 3.					
Course level: II.						
Prerequisities:						
Conditions for coun continuous written t active work in pract final oral examination	rse completion: ests ises on					
Learning outcomes: The students gain skills and competencies to the own and effective organisation and solving of experimental tasks, use of activities enhanced by digital technologies for physics teaching at lower and upper secondary level.						
Brief outline of the The practices are a selected school dem devices and comput	course: imed at practical realization and physics interpretation of different forms of onstration. The emphasis is on creative utilization of teaching aids and didactic er-aided experiments.					
Recommended literature: Šucha, J.: Metodická príručka pre rozkladný transformátor, Učebné pomôcky B.Bystrica, 1973 Demkanin, P. a kol. Počítačom podporované prírodovedné laboratórium, FMFI UK Bratislava, 2006, ISBN:80-89186-10-6 Ješková, Z., a kol. Využitie informačných a komunikačných technológií v predmete Fyzika pre stredné školy : učebný materiál - modul 3 1. vyd Košice : Elfa, 2010 242 s., ISBN 978-80-8086-146-9 Duľa, I. a kol. Využitie informačných a komunikačných technológií v predmete Fyzika pre základné školy : učebný materiál - modul 3 1. vyd Košice : Elfa, 2010 240 s., ISBN 978-80-8086-154-4 Ješková, Z., Degro, J., Onderová, Ľ.: Počítačom podporovaná výučba fyziky, PF UPJŠ, Košice, ISBN 80 - 7097 - 451 - 6 http://physedu.science.upjs.sk/sis/fyzika/experimenty/index.htm						
Course language:						
Course assessment						
Total number of assessed students: 2						

А	В	С	D	Е	FX		
0.0	100.0	0.0	0.0	0.0	0.0		
Provides: doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Marián Kireš, PhD., RNDr. Ľudmila Onderová, PhD.							
Date of last modification: 23.02.2017							
Approved: Guaranteedoc. PhDr. Anna Džambová, PhD.Guaranteeprof. PhDr. Oľga Orosová, CSc.							